BENTHOS INVESTIGATION

The fishing industry of the Northeastern United States is primarily dependent upon marine groundfish such as cod, haddock, and flounders, that live on or near the sea bottom. The availability of food for these fish certainly has a bearing on their abundance, growth, and geographic occurrence within this region. Invertebrate animals and small fishes that serve as food for the commercially valuable groundfish constitute a predominant portion of the benthos. An inventory of foods available to groundfish, in conjunction with a study of the fishes' food habits will provide basic information necessary for understanding changes in growth, shifts in distribution, and fluctuations in abundance of the major commercial groundfishes of New England.

August 6, 1959

7114a

SUMMARY CONTROL SCHEDULE

Investigation: Benthos
Biological Laboratory: Woods Hole, Mass.

Project Title	Est.* Cost	Fiscal Years 57	58	59	60	61	62	63	64	65	66
1. Groundfish food resources of Georges Bank	67.8	23.6	15.0	14.2	15.0	--	--	--	--	--	--
2. Bottom sediments of Georges Bank	40.9	--	15.0	14.2	11.7	--	--	--	--	--	--
3. Bottom sediments of Browns Bank and Southern Gulf of Maine	48.1	--	--	--	11.4	14.0	13.2	9.5	--	--	--
4. Groundfish food habits	59.1	--	--	--	11.4	16.0	18.0	13.7	--	--	--
5. Groundfish food resources of Browns Bank & southern Gulf of Me.	54.3	--	--	--	--	13.0	19.0	10.3	12.0	--	--
6. Bottom sediments of Northern Gulf of Maine	39.5	--	--	--	--	13.4	12.8	13.3	--	--	--
7. Bottom sediments of southern New England	20.3	--	--	--	--	--	--	8.3	12.0	--	--
8. Groundfish food resources of southern New England	27.1	--	--	--	--	--	--	--	15.0	12.1	--
9. Food digestion rates of New England groundfish	39.8	--	--	--	--	--	--	--	15.0	12.6	12.2
10. Groundfish food resources of northern Maine	25.3	--	--	--	--	--	--	--	--	13.1	12.2
11. Influence of hydrographic conditions on groundfish foods	28.5	--	--	--	--	--	--	--	--	16.3	12.2
12. Food requirements of New England groundfish	17.7	--	--	--	--	--	--	--	--	--	17.7
Investigation Total	468.4	23.6	30.0	28.4	49.5	56.4	63.0	55.1	54.0	54.1	54.3

Annual Review

Laboratory	Regional or Area Office	Washington Office

Prepared by: Roland L. Migley — Date 8/6/59

Recommended by: — Date

Lab. Director Herbert W. Graham 8/6/59

Reg. or Area Dir. Joseph A. Pomeroy

Branch Chief [signature] 12/24/59

Approved by: [signature]
Division Chief for Director

*Total needed by Laboratory for Project in thousands of dollars.

#714 7/9/59

U. S. Fish and Wildlife Service
Bureau of Commercial Fisheries

Sheet No. 1

Location: Woods Hole, Mass.
Date: August 6, 1959
File No.

Research Project Outline

Title of Project: Groundfish Food Resources of Georges Bank

Investigation Title: Benthos Investigation

Investigation Chief: R. L. Wigley

Project Leader: R. L. Wigley (Name), Fishery Research Biologist (Title), GS-11 (Grade)

Assistants: (Title and Grade)

R. B. Theroux, Fishery Aide, GS-5

Collaborators: U. S. National Museum, MCZ, and other scientific institutions.

Need for Information: The abundance, migrations, and growth of commercially important groundfish are closely associated with their food supply. If consistent correlations between the fish and their food supply become evident, predictions of changes in future abundance, growth rates, and geographic shifts in distribution of commercially valuable groundfish may result.

Objective: Inventory the primary groundfish foods on Georges Bank.

Method of Procedure:

Phase 1: Collect representative samples of benthic organisms by means of dredges and grab-samplers, also take photos of sea floor.

Phase 2: Sort the collections; identify and enumerate the contents.

In written reports, describe the benthic communities and the relationships between fish-foods and the abundance, growth and geographic occurrence of commercially important fishes.

Benthos - 1

Sheet No. 2 File No.:

Method of Procedure: (Cont'd)

Phase 3:

Estimated Costs: Total Needed by Laboratory for Complete Project 67.8

	FY 1959	FY 1960	FY 1961
Personal Services	5.1	5.0	--
Other Expenses:			
Within Project	1.0	1.0	--
	--	--	--
Lab. Adm. & Ser.	8.1	9.0	--
Lab. Total	14.2	15.0	--
Regional Office	.142	.150	
Washington Office			
Total			

Recommended Source of Funds S-K and Regular
(S-K, Regular, Contributed, etc.)

Estimated Date of Completion: Phase 1 FY ; Phase 2 FY ; Phase 3 FY ; Project FY 60

Recommended by:

		Date
Originator	R. L. Wigley	8/6/59
Investigation Chief	R. L. Wigley	8/6/59
Laboratory Director	Herbert W. Graham	8/6/59
Regional Director	Joseph F. Pomeroy	8/19/59
Branch Chief	[illegible]	12-24-59

Approved by:

Division Chief for Director [illegible]

Remarks

(Continue on reverse side)

#715 7/9/59

U. S. Fish and Wildlife Service
Bureau of Commercial Fisheries

Sheet No. 1

Location: Woods Hole, Mass.
Date: August 6, 1959
File No.

Research Project Outline

Title of Project: Bottom Sediments of Georges Bank

Investigation Title: Benthos Investigation

Investigation Chief: R. L. Wigley

Project Leader: R. L. Wigley, Fishery Research Biologist, GS-11
Name Title Grade

Assistants: (Title and Grade)

R. B. Theroux, Fishery Aide, GS-5

Collaborators: Director, New York Soil Testing Laboratory

Need for Information: The occurrence of many benthonic invertebrate animals, which are the basic foods of commercially important groundfish, are restricted to specific areas by the bottom sediments. Delineation of benthic faunal communities will be aided and facilitated by determining geographic occurrence of the various sediment types.

Objective: Determine the physical composition and geographic distribution of the various sediment types occurring on Georges Bank.

Method of Procedure:

Phase 1: Collect sediment samples by means of a Scoopfish sampler and Smith bottom sampler. New York Soil Testing Laboratory will analyze the samples for organic content and particle-size composition.

Phase 2: Compute the statistical parameters, and present the results in graphic and written form.

Benthos - 2

Sheet No. 2 File No.:

Method of Procedure: (Cont'd)

Phase 3:

Estimated Costs: Total Needed by Laboratory for Complete Project 40.9

	FY 1959	FY 1960	FY 1961
Personal Services	5.1	2.3	--
Other Expenses:			
Within Project	1.0	0.6	--
	--	--	--
Lab. Adm. & Ser.	8.1	8.8	--
Lab. Total	14.2	11.7	--
Regional Office	.142	.117	
Washington Office			
Total			

Recommended Source of Funds S-K and Regular
(S-K, Regular, Contributed, etc.)

Estimated Date of Completion: Phase 1 FY 58; Phase 2 FY ; Phase 3 FY ; Project FY60

Recommended by:		Date
Originator	R. L. Wigley	8/6/59
Investigation Chief	R. L. Wigley	8/6/59
Laboratory Director	Herbert W. Graham	8/6/59
Regional Director	Joseph H. Puncochar	8/19/59
Branch Chief	HWE	12-24-59
Approved by:		
Division Chief for Director	[illegible]	[illegible]

Remarks

(Continue on reverse side)

#715 7/9/59

U. S. Fish and Wildlife Service
Bureau of Commercial Fisheries

Sheet No. 1

Location: Woods Hole, Mass.
Date: August 6, 1959
File No.

Research Project Outline

Title of Project: Bottom Sediments of Browns Bank and Southern Gulf of Maine

Investigation Title: Benthos Investigation

Investigation Chief: R. L. Wigley

Project Leader: R. L. Wigley, Fishery Research Biologist, GS-11
(Name, Title, Grade)

Assistants: (Title and Grade)

R. B. Theroux, Fishery Aide, GS-5

Collaborators: Director, New York Soil Testing Laboratory

Need for Information: The occurrence of many benthonic invertebrate animals, which are the basic foods of commercially important groundfish, are restricted to specific areas by the bottom sediments. Delineation of benthic faunal communities will be aided and facilitated by determining geographic occurrence of the various sediment types.

Objective: Determine the physical composition and geographic distribution of the various sediment types occurring on Browns Bank and Southern Gulf of Maine.

Method of Procedure:

Phase 1: Collect sediment samples by means of a Scoopfish sampler and Smith bottom sampler. New York Soil Testing Laboratory will analyze the samples for organic content and particle-size composition.

Phase 2: Compute the statistical parameters, and present the results in graphic and written form.

Benthos - 3

Sheet No. 2

File No.:

Method of Procedure: (Cont'd)

Phase 3:

Estimated Costs: Total Needed by Laboratory for Complete Project 48.1

	FY 1959	FY 1960	FY 1961
Personal Services	--	2.0	4.4
Other Expenses:			
Within Project	--	0.5	1.0
	--	--	--
Lab. Adm. & Ser.	--	8.9	8.6
Lab. Total	--	11.4	14.0
Regional Office		.114	.14
Washington Office			
Total			

Recommended Source of Funds S-K and Regular
(S-K, Regular, Contributed, etc.)

Estimated Date of Completion: Phase 1 FY 60 Phase 2 FY ; Phase 3 FY ; Project FY 62

Recommended by:		Date
Originator	R. L. Wigley	8/6/59
Investigation Chief	R. L. Wigley	8/6/59
Laboratory Director	Herbert W. Graham	8/6/59
Regional Director	Joseph F. Puncochar	8/19/59
Branch Chief	HHE	12-24-59
Approved by: Division Chief for Director	[illegible]	1-4-60

Remarks

(Continue on reverse side)

#715 7/9/59

U. S. Fish and Wildlife Service
Bureau of Commercial Fisheries

Sheet No. 1

Location: Woods Hole, Mass.
Date: August 6, 1959
File No.

Research Project Outline

Title of Project: Groundfish food habits

Investigation Title: Benthos Investigation

Investigation Chief: R. L. Wigley

Project Leader: Vacant, Fishery Research Biologist, GS-7
Name Title Grade

Assistants: (Title and Grade)

Collaborators: Possibly the Cod Investigation; Hake Investigation; Flounder Investigation; Haddock Investigation.

Need for Information: Evidence from several sources indicates that some of the more valuable species of groundfish are being replaced by less valuable species. Competition for food and predation may be two of the factors causing or enhancing this shift in species composition.

Objective: Study the food habits of several of the more valuable species of groundfish and several species of their competitors and predators.

Method of Procedure:

Phase 1: Collect stomach contents of cod, haddock, pollock, yellowtail and winter flounders, whiting, spiny-dogfish shark, skates, and goosefish. Analyze the stomach contents.

Phase 2: Prepare a written report describing the kinds and quantities of each major food consumed by each species of fish.

Benthos - 4

Sheet No. 2

File No.:

Method of Procedure: (Cont'd)

Phase 3:

Estimated Costs: Total Needed by Laboratory for Complete Project 59.1

	FY 1959	FY 1960	FY 1961
Personal Services	--	2.0	5.0
Other Expenses:			
Within Project	--	0.5	2.0
	--	--	--
Lab. Adm. & Ser.	--	8.9	9.0
Lab. Total	--	11.4	16.0
Regional Office		.114	.16
Washington Office			
Total			

Recommended Source of Funds S-K and Regular
(S-K, Regular, Contributed, etc.)

Estimated Date of Completion: Phase 1 FY60 ; Phase 2 FY ; Phase 3 FY ; Project FY63

Recommended by:

		Date
Originator	R. L. Wigley	8/6/59
Investigation Chief	R. L. Wigley	8/6/59
Laboratory Director	Herbert W. Graham	8/6/59
Regional Director	Joseph H. Penniman	8/19/59
Branch Chief	HHE	12-24-59

Approved by:

Division Chief for Director

Remarks

(Continue on reverse side)

#715 7/9/59

U. S. Fish and Wildlife Service
Bureau of Commercial Fisheries

Sheet No. 1

Location: Woods Hole, Mass.
Date: August 6, 1959
File No.

Research Project Outline

Title of Project: Groundfish Food Resources of Browns Bank and Southern Gulf of Maine

Investigation Title: Benthos Investigation

Investigation Chief: R. L. Wigley

Project Leader: R. L. Wigley, Fishery Research Biologist, GS-11
Name Title Grade

Assistants: (Title and Grade)

R. B. Theroux, Fishery Aide, GS-5

Collaborators: U. S. National Museum, MCZ, and other scientific institutions.

Need for Information: The abundance, migrations, and growth of commercially important groundfish are closely associated with their food supply. If consistent correlations between the fish and their food supply become evident, predictions of changes in future abundance, growth rates, and geographic shifts in distribution of commercially valuable groundfish may result.

Objective: Inventory the primary groundfish foods on Browns Bank and Southern Gulf of Maine.

Method of Procedure:

Phase 1: Collect representative samples of benthic organisms by means of dredges and grab-samplers, also take photos of sea floor. Sort the collections; identify and enumerate the contents.

Phase 2: In written reports describe the benthic communities and the relationships between fish-foods and the abundance, growth and geographic occurrence of commercially important fishes.

Benthos - 5

Sheet No. 2 File No.:

Method of Procedure: (Cont'd)

Phase 3:

Estimated Costs: Total Needed by Laboratory for Complete Project 54.3

	FY 1959	FY 1960	FY 1961
Personal Services	--	--	3.5
Other Expenses:			
Within Project	--	--	1.4
	--	--	--
Lab. Adm. & Ser.	--	--	8.1
Lab. Total	--	--	13.0
Regional Office			.13
Washington Office			
Total			

Recommended Source of Funds S-K and Regular
(S-K, Regular, Contributed, etc.)

Estimated Date of Completion: Phase 1 FY 61; Phase 2 FY ; Phase 3 FY ; Project FY 64

Recommended by:

		Date
Originator	R. L. Wigley	8/6/59
Investigation Chief	R. L. Wigley	8/6/59
Laboratory Director	Herbert W. Graham	8/6/59
Regional Director	Joseph F. Pomeroy	8/19/59
Branch Chief	[illegible]	12-24-59

Approved by:

Division Chief for Director [illegible]

Remarks

(Continue on reverse side)

#715 7/9/59

U. S. Fish and Wildlife Service
Bureau of Commercial Fisheries

Sheet No. 1

Location: Woods Hole, Mass.
Date: August 6, 1959
File No.

Research Project Outline

Title of Project: Bottom Sediments of Northern Gulf of Maine

Investigation Title: Benthos Investigation

Investigation Chief: R. L. Wigley

Project Leader: R. L. Wigley, Fishery Research Biologist, GS-11
Name Title Grade

Assistants: (Title and Grade)
R. B. Theroux, Fishery Aide, GS-5

Collaborators: Director, New York Soil Testing Laboratory

Need for Information: The occurrence of many benthonic invertebrate animals, which are the basic foods of commercially important groundfish, are restricted to specific areas by the bottom sediments. Delineation of benthic faunal communities will be aided and facilitated by determining geographic occurrence of the various sediment types.

Objective: Determine the physical composition and geographic distribution of the various sediment types occuring in Northern Gulf of Maine.

Method of Procedure:

Phase 1: Collect sediment samples by means of a Scoopfish sampler and Smith bottom sampler. New York Soil Testing Laboratory will analyze the samples for organic content and particle-size composition.

Phase 2: Compute the statistical parameters, and present the results in graphic and written form.

Benthos - 6

Sheet No. 2 File No.:

Method of Procedure: (Cont'd)

Phase 3:

Estimated Costs: Total Needed by Laboratory for Complete Project 39.5

	FY 1959	FY 1960	FY 1961
Personal Services	--	--	3.5
Other Expenses:			
Within Project	--	--	1.0
	--	--	--
Lab. Adm. & Ser.	--	--	8.9
Lab. Total	--	--	13.4
Regional Office			.134
Washington Office			
Total			

Recommended Source of Funds S-K and Regular
(S-K, Regular, Contributed, etc.)

Estimated Date of Completion: Phase 1 FY 61; Phase 2 FY ; Phase 3 FY ; Project FY 63

Recommended by:

		Date
Originator	R. L. Wigley	8/6/59
Investigation Chief	R. L. Wigley	8/6/59
Laboratory Director	Herbert W. Graham	8/6/59
Regional Director	Joseph R. Simpson	8/19/59
Branch Chief	ZHBE	12-24-59

Approved by:

Division Chief for Director

Remarks

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#715 7/9/59